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ABSTRACT

Current methods of funding teachers' retirement systems, which base pensions on final salaries, are inequitable because they are not related to school districts' ability to pay and because they require some teachers to subsidize others. A five-state survey shows it is common for pensions to be funded by school districts and teachers, sometimes with help from the state. Data from one of the states, New York, show, first, that districts have no control over many factors affecting their salary levels, including their labor market area, percentage of special students, and size. Second, they indicate that variation among districts in their rates of salary change over time is a more important source of inequity than differences in salary schedules. Two conclusions can be drawn: (1) that pension funding based on districts' salary costs is unfair for districts with low property wealth, because districts cannot control these costs; and (2) that teachers from districts with low rates of salary change are subsidizing teachers from districts with high rates of change. One recommendation for reducing these inequities is to tie retirees' pension payments to years of experience and age and not to final salary levels. (RW)

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WORKING PAPERS IN EDUCATION FINANCE

Working Paper No. 30

EQUITY IMPLICATIONS OF METHODS OF FUNDING STATE TEACHERS' RETIREMENT SYSTEMS

by

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July 1980

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EXECUTIVE SUMMARY

Public employee retirement systems are the subject of intense research and policy interest. Many of these systems are considered to be financial time bombs. Given that the interest is there, it may be appropriate to expand the discussion to include how the funding of teacher retirement systems conforms to notions of equity in addition to their fiscal soundness.

The findings provided here demonstrate that part of the wage bill of school districts is due to factors beyond their control. School districts must compensate teachers for the characteristics of the students and the cost of living and quality of life in the area. As a result, the pension obligation of a district, when the local obligation is a constant proportion of the wage bill, can represent a hardship to low property wealth districts. However, the extra pension burden stems primarily from the extra wage payments and not from the need to hire additional faculty.

Intertemporal subsidization also is a problem. The current method permits the subsidization of pension payments to teachers in districts with relatively large wage gains by districts with relatively low wage increases. One way to alleviate this problem is to have the expected annual payment of each teacher be an exact function of the contributions for that specific teacher. However, this system would be expensive administratively and require substantial resource expenditure. Another way to attack this issue is to establish a state pension payment schedule that is not based on the final salary, but instead has steps and grades for

years of experience and age. This type of system requires that a teacher's contributions also not be based on her/his salary.

The basis of ascribing a pension burden proportionate to the wage bill may lie in the desire to tie future payments with current obligations given the payment formula and to encourage districts to show greater restraint in wage negotiations. However, both formulae, the pension burden of the district and the payment schedule, raise questions of equity and undesirable subsidizations. The payment formula seems to have little basis in necessity or desirability. Once this is recognized, the pension obligation of the district and the contribution of the teacher could also be separated from this notion. Rather, fixed contribution and payment schedules based on experience (and perhaps age) would mitigate the equity questions, although it would not necessarily be equalizing.

INTRODUCTION

Probably no other topic concerning public employees has generated as much discussion and research recently as has public employee pensions. Among the areas attracting attention are (1) retirement systems and collective bargaining agreements in which current negotiated settlements become future obligations, (2) antiquated actuarial assumptions and (3) large unfunded liabilities due to not contributing normal costs during previous years.[1] As a result, the U.S. Congress has been studying pensions and establishing the Joint Pension Task Force, and individual states have been considering reforms to their systems. However, with the emphasis on the foregoing topics, one consideration that has been overlooked is: Do the current methods of funding pensions conform to prevailing notions of equity and equalization? Given the political climate for change to this program, it may be the appropriate time to raise this issue also.

A simplified notion of equity is that expenditures for students should not be related to the wealth of the district. One concept of equalization is that the local burden should be related directly to the ability to pay. Ability to pay tends to be

[1]Writers on these aspects of pension research include: Bahl and Jump, 1974; Greenough and King, 1976; Gustman and Segal, 1977; Jump, 1976 and 1977; Mumy, 1978; Pension Task Force, 1978; Thomas, 1976 and Tilove 1976. Furthermore, the Urban Institute currently is undertaking a comprehensive study of public sector retirement systems, but is not addressing the topic considered here.

measured by either property wealth or household income or some combination of the two.[2]

It is ironic that, although state aid distributions are based on the ability to pay of the district, the concept of equalization may be ignored for the funding of the teachers' retirement system, an item which may account for over five percent of the budget of a typical district.

Pension fund obligations of school districts in some states are not based explicitly on local wealth. For instance, teachers' pensions for most school districts in New York state currently are funded by requiring school districts to contribute a fixed proportion of their total salary bill to the pension fund (McKinney's Consolidated Laws of New York, Annotated, Education Law, 52.1(2)(a)). Conversely, in Indiana, pensions are funded by an annual appropriation of the general assembly (Burns Indiana Statutes Annotaced, Code Edition, Title 21, 6-14-3.)

Although local wealth is not an explicit determinant of the pension burden, indirectly it may be related to it in states like New York. School districts may pay more than the market clearing wage to get the best teachers in that grade or step, or they may hire higher quality teachers than the average district simply because of their greater fiscal capacity. Conversely, the market clearing price varies from district to district because of varying needs of the students, leading to a higher wage bill in some

[2]For a more thorough discussion of the concepts of school finance equity and equalization, see Odden, Berne and Steifel, 1979.

districts. Therefore, the wage bill of a district may be quite high because the market dictates it and the needs of the students require it or because the district has purchased more and better teachers. In both instances the pension obligation of the district also is high. Equal pension obligations in this situation may be inequitable because in one instance the relatively high pension obligation is due to conscious choices of the district (controllable) whereas in the other instance the relatively high pension obligation has been dictated by market forces over which the district has no choice (uncontrollable).[3]

The question may be raised that if one's main source of concern with the method of determining the pension obligation is due to the uncontrollable influences on the salaries that must be paid, why not address salary variations and ability to pay? This is not the concern here because (1) a methodology is in place to accommodate the variations in salaries due to market pressures and this issue has been addressed elsewhere (Wendling, 1980; Chambers 1978) and (2) the pension fund obligation also is affected by the number of staff employed, which also can be beyond the control of the local district. Furthermore, as indicated above, the fact

[3]Another way of stating this is that if the only reason districts were paying relatively high salaries was to purchase more qualified teachers, we would not be concerned, but because there are other reasons leading to higher salaries and greater wage bills, we are concerned with the method of determining the pension fund obligation.

that state policy makers are currently interested in the pension issue makes this a most timely concern.

Another possibly unfair situation arises because the current contributed amount for a teacher may not equal the expected annual payment to the teacher. The pension payment represents deferred compensation (Shiller and Weiss, 1978); but in a state retirement system, is it deferred compensation from the state or from the district? Given that it is not the subject of local collective bargaining, except in several large central city districts, it actually should be considered deferred compensation from the state. However, because the payment to the teacher is a function of the final salary in addition to years of experience, some teachers may be subsidizing the deferred payment of others because the discount rate and the rate of wage increases differ.

This paper addresses both of these issues using the New York state system of funding pensions as the natural experiment. Reference will be made to the method of funding pensions in other states so as to indicate the possible extent of the problem.

STATE METHODS OF FUNDING TEACHERS' PENSIONS

States differ in the method used to finance teachers' pensions. Some require teachers to make a substantial contribution which is augmented by the contribution of the local district. Other states fund the pension system out of state general revenues with either additional contributions by the teacher or the school district. This section will present the method of funding in a sample of states to highlight the different approaches used.

The New York State Teachers' Retirement System requires contributions from both teachers and school districts that are required to be members. A number of districts are permitted to maintain their own pension system. The teachers' contribution is a fixed percentage of the salary. The amount required to be contributed by the local school district is a predetermined percentage of the total salaries paid to all teachers in the district (McKinney's Consolidated Laws of New York, Annotated, Education Law, 52.1(2)(a)).[4]

The Ohio and Rhode Island systems are quite similar to New York's. In both Ohio and Rhode Island, both employees (teachers) and employers (school districts) contribute to the system. In Ohio, teachers' contributions are required to be at least eight

[4]The exact wording of the law is as follows: "The amount to be contributed by each employer except those who operate local district pension systems, shall be such percentage of the total compensation or salaries of all teachers in his employ who are members of the retirement system."

percent of her/his salary, but they can be required to contribute up to 10 percent of salary. The employer must pay annually "a certain percent of the earnable compensation of all members" (Pages Ohio Revised Code, Annotated, 1978, Title 33, Section 3307.53). In Rhode Island each teacher currently pays 6 1/2 percent of salary into the system which will be increased to 7 1/2 percent in 1985 with an intermediate jump to 7 percent. The school boards are assessed a "rate percent of the compensation paid to members" (General Laws of Rhode Island, Title 3A, 16-16-22).

The state of Indiana totally revamped its pension funding method in the 1976 legislative session. The old series of rules and regulations had separate provisions for classifications of cities based on size. Furthermore, the pension obligation was based on the wealth of the district. For example, cities between 20,000 and 100,000 population levied "a special tax of one fourth of one mill [$.00025] upon each one dollar [$1.00] of taxable property in the city...and which shall be credited by the treasurer of such city to the said teachers' retirement fund" (Burns Indiana Statutes Annotated, Code Edition, Title 21, 6-14-3). Since the 1976 session, pension fund obligations are paid from the state's general fund by means of an appropriation from the general assembly.

The State of Texas uses a system similar to the current Indiana system. Each employee-member of this system is required to contribute 6.65 percent of his/her annual compensation.

Membership is compulsory. School districts are not required to contribute to the fund directly. Instead, the state contributes "an amount equal to eight and one-half percent of the aggregate annual compensation of all members of the retirement system during that same year" (Vernon's Texas Code Annotated, Title 1, 3.58).

If the pension obligation of the district is based directly on its wealth (property and/or income), it could be argued that the method for districts of funding pensions is equalized and consistent with standard notions of equity in school finance. If the employer's pension fund obligation is met by a contribution from the state's general revenues, and if the taxing structure in the state is progressive, the burden also is distributed according to ability to pay and the concept of equity also is probably satisfied; but the method used by New York, Ohio and Rhode Island may violate accepted standards because the district's wage bill -- total salaries paid by members -- is dependent on the staff size and general salary level. Some relatively less wealthy districts may actually have a greater wage bill per student than more wealthy districts because the additional wage payments to compensate for the characteristics of the district and region -- compensating differentials -- may increase salary levels and concentrations of students with special needs and characteristics may require more teachers for a particular size student body than would be necessary under more typical circumstances. The greater wage bill does not necessarily represent greater education resources, but may reflect greater factor prices, still unmet needs and smaller quantities of other education resources.

SOURCES OF INEQUITY

As indicated in the Introduction, potential inequities may arise in this system of funding because (1) the district's required contribution is not based on a district's ability to pay and (2) the taxpayers in one district may be contributing to the pension payments of teachers in another district. Therefore, some districts' obligations may be uncontrollably high and some school districts may be subsidizing the future payments of other districts. The teacher's contribution is not part of the analysis, but its existence does constrain the policy options.

The Wage Bill and Ability to Pay

The theory of compensating (equalizing) differentials asserts that additional or reduced compensation is paid for specific characteristics, depending on whether the attributes are viewed negatively or favorably (Lucas, 1974). The conditions of employment in a competitive market must be equal across competing employment opportunities. If the working conditions of one job are less desirable than others, a wage premium must be paid to make that job equal to the other positions. For example, work hazards generally are viewed as a negative attribute of a job and therefore, a compensating differential must be paid to make that job competitive with a less hazardous job that is similar in all other respects. Conversely, most individuals prefer working with very bright and competent coworkers and therefore, a position with this characteristic may command a negative differential. Not only

are equalizing differentials attached to characteristics of the workplace, but also they are used to compensate for differences in the quality of life in the area.

The theory of compensating differentials also should hold for the education workplace. Districts differ in their endowments -- the characteristics of the students, enrollment, working environment and the cost of living and quality of life in the area. Except for the working environment, the district has no control over these factors; but they must compensate teachers for their specific attributes in order to equalize the conditions of employment. For instance, research in New York state has demonstrated that larger school districts, districts with larger than average proportions of students with special education needs (PSEN) and handicapped students, and districts that are located in certain metropolitan areas must compensate the average teacher more than the average district must to equalize for these features (Wendling, 1980).[5] An example of the extra compensation necessary is that each additional student with a handicapping condition tended to raise compensation by $.35, holding all other factors constant. Teaching in the high cost New York City metropolitan area relative to the nonmetropolitan areas of the state tended to require an additional $4,200 compensation, about 25 percent more.

[5]Pupils with special education needs is a categorization used in New York state. Specifically, the percentage of students placed in this category is determined by the percentage below minimum competence as measured by third and sixth grade achievement test scores.

Not only can the wage bill be increased because of the compensating differentials that some districts must pay, but also school districts may be required to hire more faculty simply to provide a minimum level of education services to their students because their students have special needs, or because their small enrollment requires them to hire more staff per pupil than the average district. Therefore, their wage bill also may be uncontrollably high.

Because pension obligations of districts are calculated on the basis of their wage bill, and since the wage bill of districts is affected by an entire range of factors in addition to ability to pay, certain districts may be experiencing fiscal hardships because their pension obligation is not a function of their ability to pay.

Equal Current Obligations and Unequal Expected Payments

If the present worth of future pension obligations differs for two teachers (or any two individuals), contributing the same amount at a point in time for these individuals actually may be inequitable.[6] For instance, two individuals may have identical salaries and theoretically should have the same amount contributed

[6]The present worth is substituted for the more technical term, the discounted present value. The present worth of future obligations is calculated by taking the actual value of those future obligations and deflating them by the discount rate, the rate at which individuals are willing to trade present use of money for future use. For instance, a discount rate of 0.10 indicates that an individual would have to receive $1.10 next year to forego $1.00 this year.

for them; but the future pension obligation for each differs because one is ready to retire and the other must work several more years in order to retire with full benefits. Naturally, this discussion only holds for states that specify that the final pension payment to the individual is a function of experience and final average salary, which tends to be the norm.

Consider the formula for New York State. As currently written, a teacher who retires in July 1980 who is at least 55 years of age and has worked 20 years will receive an annual pension payment calculated in the following manner:

$$\text{Annual Payment} = (\text{Constant Percent})(\text{Final Average Salary})(\text{Years of Service})$$

where the constant percent is equal to two percent. If we assume that the final average salary is $25,000, the expected annual payment is:

$$\text{Annual Payment} = (.02)(25{,}000)(20) = \$10{,}000$$

Next, consider the teacher who retires after 25 years of service and has a final average salary of $20,000.[7] The annual payment in this instance is:

$$\text{Annual Payment} = (.02)(20{,}000)(25) = \$10{,}000$$

[7] This calculation ignores the fact that New York state uses a different constant percent for years of experience accumulated prior to 1959, of which this individual would have some. However, the thrust of the analysis does not differ because of this exclusion.

The annual payment is the same for both teachers even though their average final salary and years of experience differ considerably. If the current year is (n-1) and n is the first year of retirement, the mathematically correct contribution (ignoring mortality assumptions) of the school district is $10,000.[8] Yet, under the current method of contributing to the fund, the amount deposited for the second teacher would be less than the first. This is not necessarily a problem because the district has been contributing funds for the teacher with 25 years of experience for an additional 5 years relative to the one with 20 years of experience.

Next consider the case in which two individuals in different districts will retire with the same number of years of experience. Both have the same current salary but the first individual has worked for 15 years and will not retire for another 5 years, whereas the second individual is ready to retire, having taught for 20 years. Assuming that both individuals are currently making $20,000 per year, the expected annual payment for the first individual is:

$$\text{Expected Annual Payment} = (.02)[20,000(1+w)^5](20)$$
$$= \$8,000(1+w)^5$$

where w is the expected annual increase in wages.

The expected annual payment for the second individual is:

$$\text{Expected Annual Payment} = (.02)[20,000](20) = \$8,000$$

[8]Notice it also has been implicitly assumed that the school district makes its contribution at the end of the year but the retirement system makes the amount available to the pensioner in a lump sum at the beginning of the year.

Since their current earnings are the same, the amount contributed into the pension fund also is the same. However, unless (w) is expected to be zero, there is a possibility of subsidization. If (w) differs from zero, the contribution made for the first individual is equitable only as long as (w) equals (r) where (r) is the discount rate.

The future values of the contribution for the first individual can be represented by $(c)(20,000)(1+r)^5$ where (c) is the constant share contribution. If (c) is equal to 40 percent and the discount rate is equal to 10 percent, the contribution made this year will be worth \$8,800, \$9,680, \$10,648, \$11,713 and \$12,884 in each of the next five years, respectively. If salary increases equal 10 percent per year, then the contribution made this year will be the mathematically equitable one. If salary increases are less than 10 percent, the future value of current pension payments will exceed the expected annual pension benefit.

For example, if (w) equals five percent, the final average salary of the first teacher will be \$25,526 and the expected annual payment from the pension fund will equal \$10,210. But the actual value of the contribution made five years ago will be \$12,884. Thus, the future value of the contribution made actually is greater than the annual payment to be received. The converse holds if the discount rate is less than the rate of wage increase.

If (w) is greater than (r) at times and the converse holds for other times during the working life of the typical individual across districts, then it is possible that the subsidization

across districts will cancel out. The discount rate should be relatively constant across districts because it is determined in the market where it is affected by the level of inflation, investment opportunities and the risk attached to the asset. The rate of wage increases, however, may vary substantially across districts. Therefore, districts with lower rates of wage increases will be subsidizing the pension payments to individuals in districts with higher rates of wage increases.

DATA AND ESTIMATION

The possible inequities described earlier will be analyzed using data for New York state. School district information on teacher salary schedules, median teacher salaries, characteristics of the student population, ability to pay and quality of life will be utilized to address the extra pension burden borne by some school districts and the nature of the intertemporal subsidization in pension payments.

The equity implication of the extra pension burdens borne by some school districts will be addressed by examining the influences of factors beyond the control of the district on the two components of the wage bill: teachers' salaries and the number of teachers hired. Are some districts required to pay higher salaries and need to employ more teachers because of conditions beyond their control, and as a result, they are required to contribute a relatively large amount to the state retirement system, irrespective of their ability to pay? Previous research by the author has calculated the equalizing differentials in teachers' salaries necessary for the uncontrollable factors (Wendling, 1980). They will be discussed here. To analyze the equity implications of staffing patterns, variations in the pupil-teacher ratio across school districts due to the school districts's endowments will be estimated.

It is hypothesized that variations in the pupil-teacher ratio should depend on the percent of the student body with special education needs (PSEN), percent of students handicapped, percent

elementary students, the combined average daily membership in addition to income and wealth measures and the degree of labor market competition.[9] Since the education needs of PSENs and handicapped students are greater, it is expected that they require more contact with the primary education resource -- the teacher -- which should lead to a lower pupil-teacher ratio. This, in turn, should increase the wage bill. An increase in the combined average daily membership is expected to increase the pupil-teacher ratio because classes are more likely to approach the efficient size. Rather than having only 10 students in a fourth year French class, for example, which may occur in small schools, demand may be sufficient to have 22 students enrolled in the class. Both income and wealth measures and the degree of labor market competition are expected to be associated with smaller values of this ratio. If a small class is a positive good, presumably school districts will attempt to purchase more smaller classes; but to do so is not without cost. Thus, those districts with greater fiscal capacity will be able to purchase more smaller classes. If the labor market conditions are such that teachers have a number of alternatives, either in other school districts or other industries, the school district will have to respond to these pressures either by increasing salaries or by improving

[9]In this analysis the degree of labor market competition is measured by a series of dummy variables indicating the specific labor market area in which the school district is located. These variables reflect not only the competition for teachers but also the opportunities available, and relative wages, in alternative occupations. The labor market areas have been defined by the New York State Department of Labor.

working conditions, one of which is decreasing the number of students per teacher.

The salary schedules for teachers in 483 school districts have been provided by the New York State United Teachers. School district data on teachers, students and ability to pay are drawn from the Consolidated Data Base of the Education Department of New York State. Quality of life factors, when used, are from the City and County Data Book of the U.S. Bureau of the Census. The cost of education index is taken from Wendling (1980). Most data are for the 1977-78 school year, but median teachers' salary data for the 1974-75 school year also are available so that salary changes can be calculated.

The intertemporal issue will be addressed by investigating the extent of overlap between steps in the salary schedule and by conducting an analysis of the determinants of variations in salary changes. The purpose of this latter phase is to assess what type of school districts have had relatively large and small gains in order to come to some conclusion about the possible direction of intertemporal subsidization.

The a priori expectation is that the percent change in the median salary of school districts will depend on the percent change in pupils with special education needs, handicapped students, minority students, the combined average daily membership, male teachers and property wealth per pupil. Other determinants are expected to include the property wealth per pupil, income per return and the degree of competition among school districts in the regional labor market. The theoretical

relationships between salary levels and levels of the independent factors have been discussed elsewhere (Lipsky and Drotning, 1973; Antos and Rosen, 1975; Chambers, 1978; and Wendling 1980. The rationale for using changes in the independent variables to determine variations in changes in the dependent variable is the assumption that the labor market is constantly responding to different conditions. If the theory of equalizing differentials is operative, changes in the conditions that were previously equalized require that further adjustments be made in the compensation.[10]

The level of wealth and income, plus the degree of competition, are included to reflect partially the ability to pay and partially to reflect the bargaining relationship. The greater the level of wealth and income, the more likely it is that the teachers' bargaining unit perceives that the gains from tough bargaining will be greater. The degree of competition should encourage districts to match the offers of other districts so as to maintain their staffs.

[10]Several of the change variables are included for reasons other than the equalizing differences concern. Percent change in male teachers is included to incorporate changing militancy (Kleiner and Krider, 1979). Percent change in teachers with a Master's degree is to reflect the change to a new salary schedule. Percent change in full value per pupil attempts to capture changes in the ability to pay and altered incentives in bargaining.

RESULTS

The Wage Bill and Uncontrollable Factors

School districts cover a geographic area. Although actions of a school district can affect its environment, generally the school district exists in an environment which is largely determined by other forces. Since school districts compete in a market for personnel with school districts having other environments, they may need to compensate for characteristics they possess that are viewed unfavorably or they may be able to offer lower compensation because they possess a number of favorable characteristics. The market determined differentials can raise or lower the salary that a school district must pay in order to staff its schools.

The "prices" attached to these uncontrollable factors for teachers in New York state for the 1977-78 school year are listed in Table 1. The price of a one percent increase in handicapped students is $17 and the price for a one percent increase in district size is $25, which means that an additional student within a certain range school district size has a price of $.50. The price attached to working in the New York City labor market area is $4,180. This measure is probably reflecting differences in the cost of living, congestion, pollution, cultural activities, variety and alternative labor market opportunities. It must be remembered that this "price" is an average price across a

number of teachers. It includes the compensating differential that some must be paid to induce them to live with the congestion and pollution, but it also includes the compensation (negative) that some are willing to forego for the opportunity to live in an area with the range of cultural offerings and variety of activities.

Table 1

COMPENSATING SALARY EFFECTS OF FACTORS BEYOND THE CONTROL OF THE SCHOOL DISTRICT FOR NEW YORK STATE TEACHERS, 1977-78

Uncontrollable Factors	Percentage Effect Salaries	Absolute Effect Salaries
Handicapped Students (Percent)	.104	$ 17
Pupils with Special Education Needs (Percent)	.092	17
District Size	.151	25
District Size Squared	-.014	-2
Population Density in County	.005	1
Full Value Per Square Mile	-.001	0
New York City LMA	24.86	4,180
Nassau-Suffolk LMA	19.72	3,317
Albany-Schnectady-Troy LMA	.00	00
Binghamton LMA	-7.60	-1,278
Buffalo LMA	4.08	686
Elmira LMA	-7.96	-1,340
Poughkeepsie LMA	7.47	1,256
Rochester LMA	7.57	1,274
Syracuse LMA	-1.19	-201
Utica-Rome LMA	-4.50	-757
Nonmetropolitan LMA	---	---

Source: Wayne Wendling. "The Cost of Education Index: Measurement of Price Differences of Education Personnel Among New York State School Districts." Working Paper in Education Finance, No. 26. Denver, Colo.: Education Finance Center, Education Commission of the States. 1980.

A district that is typical in all respects and located in a nonmetropolitan area of the state would have needed to pay approximately $15,215 for a teacher with a Master's Degree and 10 years of experience during the 1977-78 school year. However, a school district located in the New York City labor market area that has an additional one percent students, plus one percent more students with special education needs and handicapped students than the average district would need to pay over $19,000 for a teacher with similar characteristics. The same teacher working under the same conditions except that it is located in the Syracuse school district would need to be paid just under $15,000. Thus, these uncontrollable characteristics can increase the market clearing salary in a district by 15 to 25 percent above the average salary in the state.

Table 2 indicates the factors associated with extra salary costs.[11] The extra salary burden is higher in high income areas and lower in property wealthy areas. Furthermore, as expected, the burden increases as the percent of students with special education needs and handicapped students increases. Given that principally used measure of ability to pay is the property wealth

[11]Using an index of the price of education resources as the dependent variable for this analysis is subject to some error because it also measures the extra salary burden for administrators. However, the correlation between the index for teachers and the combined index used here is over .95. The positive correlation with income is probably due to the fact that incomes tend to be higher in high cost of living areas and the cost of living is an important determinant of the market determined wage.

Table 2

DETERMINANTS OF VARIATIONS IN THE COST OF EDUCATION INDEX FOR NEW YORK STATE

Dependent Variable	Price of Education Resources		
	Coefficient	Standard Error	Mean Value
Independent Variables			
Income Per Return	.0000148*	.00000	13,844.
Full Value Per Pupil	-.0000001*	.00000	70,888.
Combined Average Daily Membership (Natural Log)	.0000002*	.00000	7.512
Pupils With Special Education Needs (Percent)	.148*	.045	.169
Handicapped Students	.266*	.057	.067
Constant	.710		
Sample Size	565		
Mean Index Value	.952		
Explained Variance (R^2)	.487		
Standard Error of the Estimate	.062		

*Indicates statistically significant at the 0.90 level

of the community, the negative correlation between the extra salary costs and wealth suggests that the current method of funding pensions may be inequitable. However, income also is not considered a measure of ability to pay in some states such that the real question of whether the method is inequitable depends on the relative strength of the two measures as determinants of ability to pay.

The other element of the wage bill is the impact of the school district environment on the pupil-teacher ratio. This issue is raised in Table 3. The pupil-teacher ratio decreases (the number of teachers increases) in districts with relatively

Table 3

DETERMINANTS OF VARIATIONS IN THE PUPIL-TEACHER RATIO
IN NEW YORK STATE SCHOOLS, 1977-78

Dependent Variable	Pupil-Teacher Ratio		
	Coefficient	Standard Error	Mean Value
Independent Variables			
Pupils with Special Education Needs (Percent)	-5.099*	1.239	.169
Handicapped Students (Percent)	-1.673	1.614	.067
Elementary Students (Percent)	.063*	.007	.489
Combined Average Daily Membership (Natural Log)	.987*	.087	7.512
Income Per Return (Natural Log)	-.549	.407	9.501
Full Value Per Pupil (Natural Log)	-1.854*	.146	10.895
Labor Market Competition	2.384	3.226	.026
Constant	34.068		
Sample Size	565		
Mean Pupil-Teacher Ratio	18.26		
Explained Variance (R^2)	.456		
Standard Error of Estimate	1.700		

*Indicates statistically significant at the 0.90 level

high percentages of students with special education needs and in property wealthy districts. The ratio is greater in larger school districts probably because classrooms and course offerings can be scheduled more efficiently.

The negative coefficient on PSEN suggests that increases in the proportion of PSENs decreases the pupil teacher ratio with the

result that the wage bill is increased. The same also holds at statistically significant levels for the variable, full value per pupil. In fact, the marginal effect of the PSEN variable is greater than that of full value. A one percent increase in PSENs reduces the pupil teacher ratio by 0.05 students, assuming the mean value of class size, and a one percent reduction in full value per pupil is associated with a reduction of 0.02 students per class. However, the net influence -- the coefficient times the mean value -- of full value per pupil is greater than that of the PSEN variable. As a result, the extra pension burden due to this influence on the wage bill exists, but is likely to be quite small.

Intertemporal Subsidization Across Districts

The extent of intertemporal subsidization depends on the distribution of salaries by steps and the rate of change in salaries over time. As discussed earlier, the subsidization question arises if two individuals are paid the same salary and therefore, have the same amount contributed by their districts as the pension obligation, but the future value of those contributions vary because of differences in the starting date of pension receipts. Therefore, the extent of overlap of salary schedules should provide some insight into this question.

The ranges of salary schedules for three degree statuses and three steps within each degree status are listed in Table 4. The range provided includes 67 percent of the schedule values since the range used here is the mean value plus or minus one standard

Table 4

RANGE OF SALARY SCHEDULE VALUES
FOR NEW YORK STATE SCHOOL DISTRICTS*

Degree Status and Step	Range: Nominal Salary	Range: Real Salary
Bachelor's Degree: Step One	$ 9,038-11,314	$ 9,959-11,259
Bachelor's Degree: Step Five	10,637-13,445	11,783-13,313
Bachelor's Degree: Step Ten	12,514-16,220	13,882-16,044
Master's Degree: Step One	9,845-12,885	10,974-12,682
Master's Degree: Step Five	11,418-15,206	12,774-14,918
Master's Degree: Step Ten	13,431-18,285	15,129-17,817
Master's Degree Plus 30 Credits: Step One	10,411-13,871	11,648-13,604
Master's Degree Plus 30 Credits: Step Five	12,039-16,241	13,525-15,867
Master's Degree Plus 30 Credits: Step Ten	14,024-19,372	15,812-18,860

*The lower value of the range is calculated as X'-1 sd and the upper value of the range is calculated as X'+1 sd where X' is the average value for the grade and step and sd is the standard deviation of salaries for the grade and step.

deviation. This differs from other definitions of range often used. Both the actual (nominal) salary and the salary deflated by the price of education resources index are provided.[12]

The range of nominal values indicates substantial overlap across steps within the same degree status. For the Bachelor's degree, step five overlaps with step one in the same grade for

[12]Deflating the salary schedule by the price of education resources index is subject to the same sort of criticism that using a cost of living index to adjust for differences in education purchasing power is subject to. Teachers are not likely to purchase an education basket of goods and services nor are school districts likely to purchase the same package as the typical urban consumer. However, since cost of living variations constitute a large proportion of the variation in the price of education index in New York state, the adjustment should provide some insight into the real value of the salaries.

30 percent of the range. For the same steps in the Master's Degree grade, the overlap approaches 50 percent which is similar to the shared range for steps 5 and 10 in the same grade. However, there is no overlap between the first step and the tenth step in any of the grades.[13]

Almost all overlap disappears when the salary schedule values are deflated by the price of education resources index. Furthermore, the lower values generally are increased more than the upper values are decreased. This indicates that the low cost rural districts generally are located in the lower end of the salary distribution.

Results for the analysis of determinants of change in teachers' salaries are listed in Table 5. Although many of the independent variables have statistically significant coefficient values, the explanatory power of the equation is relatively low, explaining only 14 percent of the variation.

The variables of primary interest are full value per pupil, both the level and change, and income per return.[14] The actual level of full value per pupil is negative and not significant

[13]It is recognized that the steps provided are discrete and that the actual overlap is much greater between step one and step three. The potential for subsidization increases though, as the overlap extends across more years because of the compounding effect of the discount rate.

[14]Theoretical considerations probably would argue for the inclusion of the change in income per return. However, household income by school district was first collected for 1977, making it impossible to calculate a change value.

Table 5

DETERMINANTS OF CHANGE IN TEACHERS' SALARIES
IN NEW YORK STATE, 1974-75 TO 1977-78

Dependent Variable	Percent Change in Salaries, 1974-75 to 1977-78		
	Coefficient	Standard Error	Mean Value
Independent Variables			
Pupils with Special Education Needs (Percent Change)	-.025*	.007	.189
Handicapped Students (Percent Change)	.003*	.001	1.224
Minority Students (Percent Change)	.009	.012	.078
Combined Average Daily Membership (Percent Change)	-.088*	.042	.076
Male Teachers (Percent Change)	-.029*	.007	.031
Teachers with Master's Degrees (Percent Change)	.004*	.002	.314
Full Value Per Pupil (Percent Change)	-.009	.005	.627
Full Value Per Pupil (Natural Log)	-.007	.005	10.895
Income Per Return (Natural Log)	.099*	.015	9.501
Labor Market Competition	-.071	.139	.026
Constant	-.646		
Sample Size	565		
Mean Percent Change in Salaries	.225		
Explained Variance (R^2)	.144		
Standard Error of Estimate	.074		

*Indicates statistically significant at the 0.90 level

whereas the change measure is also negative but significant. Income per return in the school district is the most important determinant of salary changes.[15] Recall that the smaller the annual salary increase, the more likely it is that current pension obligations are subsidizing future pension payments and that the larger the annual salary increase, the more likely it is that current pension obligations are being subsidized by future pension obligations.

Given that salary increases are not related at all to property wealth levels, but are strongly associated with income per return, the intertemporal subsidization may be inequitable in that other districts -- less affluent as measured by income -- may actually be subsidizing the future pension payments to teachers who taught in high income districts. However, although it is not possible to make a definite conclusion on this issue, it is an issue which does raise questions about the payment formula in use in states such as New York, where the annual payment to a retiree is a function of the final salary.

Specifically, one purpose of a state retirement system is to facilitate mobility of teachers among districts in addition to the cost reasons of economies of scale and financial viability inherent in managing one system as opposed to having local districts each manage their own system. Because it is a state system, is there any reason for the payment to the retired teacher

[15]This may not only be reflecting an ability to pay factor, but it also may be influenced by socioeconomic comparison with the residents of the district.

to be based on the final average salary other than the fact that the teacher contributes a percentage of her/his salary? Although it is deferred compensation it is not collectively bargained locally and, therefore, does not represent any special tradeoff between current compensation and future compensation. Instead, a system based exclusively on expected years of experience would meet the income objectives, facilitate mobility and avoid the potential problem of taxpayers in one district subsidizing payments to teachers in another district.

CONCLUSION

Public employee retirement systems are the subject of intense research and policy interest. Many of these systems are considered to be financial time bombs. Given that the interest is there, it may be appropriate to expand the discussion to include how the funding of teacher retirement systems conforms to notions of equity in addition to their fiscal soundness.

The findings provided here demonstrate that part of the wage bill of school districts is due to factors beyond their control. School districts must compensate teachers for the characteristics of the students and the cost of living and quality of life in the area. As a result, the pension obligation of a district, when the local obligation is a constant proportion of the wage bill, can represent a hardship to low property wealth districts. However, the extra pension burden stems primarily from the extra wage payments and not from the need to hire additional faculty.

Intertemporal subsidization also is a problem. The current method permits the subsidization of pension payments to teachers in districts with relatively large wage gains by districts with relatively low wage increases. One way to alleviate this problem is to have the expected annual payment of each teacher be an exact function of the contributions for that specific teacher. However, this system would be expensive administratively and require substantial resource expenditure. Another way to attack this issue is to establish a state pension payment schedule that is not

based on the final salary, but instead has steps and grades for years of experience and age. This type of system requires that a teacher's contributions also not be based on her/his salary.

The basis of ascribing a pension burden proportionate to the wage bill may lie in the desire to tie future payments with current obligations given the payment formula and to encourage districts to show greater restraint in wage negotiations. However, both formulae, the pension burden of the district and the payment schedule, raise questions of equity and undesirable subsidizations. The payment formula seems to have little basis in necessity or desirability. Once this is recognized, the pension obligation of the district and the contribution of the teacher could also be separated from this notion. Rather, fixed contribution and payment schedules based on experience (and perhaps age) would mitigate the equity questions, although it would not necessarily be equalizing.

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